

We claim:

1. A method for facilitating adaptive transmissions in a multi-carrier, multi-dimension domain, comprising:
  - 5 - providing data to be transmitted to at least one transmission target;
  - determining whether likely trustworthy channel quality data is obtainable;
  - when likely trustworthy channel quality data is not obtainable, determining at least whether, how, and when to transmit at least a portion of the data pursuant to a first transmission selection mode;
  - 10 - when likely trustworthy channel quality data is obtainable, at least attempting to obtain channel quality data;
  - when channel quality data is obtained, using the channel quality data to determine at least whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selection mode.
- 15 2. The method of claim 1 wherein determining whether likely trustworthy channel quality data is obtainable further includes determining whether channel quality data would likely be accurate at a time when used.
- 20 3. The method of claim 2 wherein determining whether channel quality data would likely be accurate at a time when used includes determining whether channel quality data would likely be accurate at a time when used for each of a plurality of sub-carriers.
- 25 4. The method of claim 1 wherein determining whether likely trustworthy channel quality data is obtainable includes obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target.
- 30 5. The method of claim 4 wherein obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target includes obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target

comprising at least one of a velocity of the transmission target, a geographic location of the transmission target, Doppler power spectrum estimations, maximum Doppler frequency estimations, time based comparisons of channel frequency response, and a cruise control setting that corresponds to the transmission target.

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6. The method of claim 4 wherein obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target includes accessing previously acquired data.

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7. The method of claim 5 wherein obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target includes acquiring new data.

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8. The method of claim 5 wherein determining whether likely trustworthy channel quality data is obtainable includes obtaining data that tends to reflect a rate of change of channel characteristics as pertains to the transmission target.

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9. The method of claim 8 wherein obtaining data that tends to reflect a rate of change of channel characteristics as pertains to the transmission target includes receiving a single bit that comprises the data. 10. The method of claim 8 wherein obtaining data that tends to reflect a rate of change of channel characteristics as pertains to the transmission target includes obtaining data that tends to reflect a rate of change of frequency dimension channel characteristics.

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11. The method of claim 8 wherein obtaining data that tends to reflect a rate of change of channel characteristics as pertains to the transmission target includes obtaining data that tends to reflect a rate of change of time dimension channel characteristics.

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12. The method of claim 4 wherein obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target includes receiving a transmission from the transmission target that includes information regarding the channel coherence time attribute.

13. The method of claim 1 wherein using the channel quality data to determine whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selective mode includes selecting a particular carrier from amongst a plurality of candidate carriers.

14. The method of claim 1 wherein using the channel quality data to determine whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selective mode includes selecting a plurality of carriers from amongst a plurality of candidate carriers.

15. The method of claim 1 wherein using the channel quality data to determine whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selective mode includes determining not to transmit at least a portion of the data.

16. The method of claim 1 wherein using the channel quality data to determine whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selective mode includes selecting a particular modulation and coding scheme from amongst a plurality of candidate modulation and coding schemes.

17. The method of claim 16 wherein selecting a particular modulation and codingscheme from amongst a plurality of candidate modulation and coding schemes includes selecting a particular modulation and coding scheme based at least in part upon individual subband channel quality indicator information for a plurality of subbands.

18. The method of claim 1 wherein determining at least whether, how, and when to transmit at least a portion of the data pursuant to a first transmission selection mode includes selecting a particular modulation and coding scheme from amongst a plurality of candidate modulation and coding scheme.

19. The method of claim 18 wherein selecting a particular modulation and coding scheme from amongst a plurality of candidate modulation and coding schemes includes selecting a particular modulation and coding scheme based at least in part  
5 upon channel quality indicator information as averaged across a plurality of subbands.

20. The method of claim 1 wherein using the channel quality data to determine whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selective mode includes selecting a first modulation and coding scheme  
10 for use with a first carrier and a second modulation and coding scheme for use with a second carrier to transmit at least a portion of the data.

21. The method of claim 1 wherein at least attempting to obtain channel quality data includes:  
15 - transmitting a signal to the transmission target; and  
- receiving a response from the transmission target, which response includes channel quality data.

22. The method of claim 21 wherein transmitting a signal to the transmission target  
20 includes transmitting a fast sounding channel evaluation signal such that the transmission target can evaluate a time-frequency response of the multi-carrier domain.

23. The method of claim 22 wherein receiving a response from the transmission  
25 target, which response includes channel quality data, includes receiving a response from the transmission target, which response includes individual channel quality indicator information for at least some carriers in the multi-carrier domain.

24. The method of claim 21 wherein receiving a response from the transmission  
30 target, which response includes channel quality data further comprises receiving a response from the transmission target, which response includes at least frequency

domain channel quality data.

25. The method of claim 1 wherein determining at least whether, how, and when to transmit at least a portion of the data pursuant to the first transmission selection mode  
5 and the second transmission selection mode both include in all cases where data is transmitted transmission of data within a frame of constant size.

26. The method of claim 25 wherein using the channel quality data to determine at least whether, how, and when to transmit at least a portion of the data pursuant to a  
10 second transmission selection mode includes using the channel quality data to complete a determination, prior to a next data transmission opportunity, of at least whether, how, and when to transmit at least a portion of the data to be transmitted.

27. The method of claim 1 wherein using the channel quality data to determine at least  
15 whether, how, and when to transmit at least a portion of the data pursuant to a second transmission selection mode includes using the channel quality data to determine at least whether, how, which transmitter to use, and when to transmit at least a portion of the data pursuant to a second transmission selection mode.

20 28. A method for facilitating adaptive transmissions in a multi-carrier communications system comprising:  
- providing a plurality of communications signal carriers and a plurality of modulation and coding schemes;  
- providing data to be transmitted to a plurality of transmission targets;  
25 - determining whether likely trustworthy channel quality data is obtainable for the transmission targets by accessing data that tends to reflect a rate of change of channel characteristic as pertains to the transmission targets;  
- when likely trustworthy channel quality data is not obtainable for a first given transmission target, selecting a first modulation and coding scheme based upon  
30 overall average channel quality indicator for the plurality of communications signal carriers to use when transmitting at least part of the data to the first given transmission

target;

- when likely trustworthy channel quality data is obtainable for a second given transmission target, accessing at least channel quality data that includes channel quality indicator information for at least some individual carriers of the multi-carrier communication system;

- using at least the channel quality indicator information for at least some individual carriers to select a second modulation and coding scheme to use when transmitting at least part of the data to the second given transmission target.

29. The method of claim 28 wherein:

- selecting a first modulation and coding scheme based upon overall average channel quality indicator for the plurality of communications signal carriers to use when transmitting at least part of the data to the first given transmission target includes selecting a plurality of the individual carriers, for at least a portion of a next

transmission opportunity, to use when transmitting to the first given transmission target; and

- selecting a second modulation and coding scheme to use when transmitting at least part of the data to the second given transmission target includes selecting one of the individual carriers, for at least a portion of a next transmission opportunity, to use

when transmitting to the second given transmission target.

30. A method for facilitating adaptive transmissions comprising:

- providing data to be transmitted;

- determining that the data includes first data to be transmitted to a first transmission target and second data to be transmitted to a second transmission target;

- determining whether likely trustworthy channel quality data is obtainable for each transmission target;

- when likely trustworthy channel quality data is not obtainable for a particular transmission target, determining at least whether, how, and when to transmit at least a portion of the data to that particular transmission target pursuant to a first transmission selection mode;

- when likely trustworthy channel quality data is obtainable for a given transmission target, at least attempting to obtain the corresponding channel quality data;
- when the channel quality data is obtained, using the channel quality data to determine at least whether, how, and when to transmit at least a portion of the data to be given transmission target pursuant to a second transmission selection mode.

31. The method of claim 30 wherein determining whether likely trustworthy channel quality data is obtainable for each transmission target includes obtaining data that tends to reflect at least a channel coherence time attribute of each of the transmission targets.

32. The method of claim 30 wherein when likely trustworthy channel quality data is obtainable for a given transmission target, at least attempting to obtain the corresponding channel quality data further includes at least attempting to obtain the corresponding channel quality data for each of a plurality of candidate carriers.

33. The method of claim 30 wherein using the channel quality data to determine at least whether, how, and when to transmit at least a portion of the data to be given transmission target pursuant to a second transmission selection mode includes matching transmission targets to candidate carriers, which carriers appear to be better suited to support transmissions to the corresponding matched transmission target.

34. The method of claim 33 wherein matching transmission targets to candidate carriers includes considering matching multiple candidate carriers to a particular transmission target to thereby facilitate use of multiple candidate carriers when transmitting data to the particular transmission target.

35. A method for use by a mobile communications unit that communicates in a multi-carrier, multi-dimension domain, comprising:

- evaluating channel response for a channel in the multi-carrier, multi-dimension domain;

- determining channel coherence time for a multi-carrier channel;  
- when the channel coherence time indicates that the multi-carrier channel is changing too quickly, transmitting a message that includes:

- an indication of the channel coherence time status; and

5       - average channel quality indicator information across the multi-carrier channel;

- when the channel coherence time does not indicate that the multi-carrier channel is changing too quickly, transmitting a message that includes:

- an indication of the channel coherence time status; and

10       - channel quality indicator information for a plurality of the carriers that comprise the multi-carrier channel.

36. The method of claim 35 wherein determining channel coherence time for a multi-carrier channel includes directly measuring a speed of movement of the mobile communications unit.

37. The method of claim 35 wherein determining channel coherence time for a multi-carrier channel includes at least estimating a Doppler power spectrum.

38. The method of claim 35 wherein determining channel coherence time for a multi-carrier channel includes comparing channel frequency response as determined at differing times.